

APPENDIX G

Environmental Noise Assessment Report

ENVIRONMENTAL NOISE ASSESSMENT
for the
Agua Hedionda South Shore Specific Plan
for 85% Open Space and 15% Retail

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SUMMARY

The Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail (Agua Hedionda 85/15 Specific Plan or Specific Plan) is comprised of approximately 203.4 acres of land between the south shore of the Agua Hedionda Lagoon and Cannon Road in the City of Carlsbad, California. The Specific Plan will permanently protect and conserve approximately 176.7 acres for open space, the continuation of strawberry farming and coastal agricultural (more than 85% of the Specific Plan area), and will reserve approximately 26.7 acres (less than 15% of the Specific Plan area) for a new pedestrian-friendly visitor serving outdoor retail, shopping, dining and entertainment promenade, at no tax burden to the residents of Carlsbad.

Nearby existing land uses consist of the Agua Hedionda Lagoon to the north with residential uses along the north side of the lagoon, commercial and agricultural uses to the south, residential uses to the east, and I-5 to the west.

The primary existing and future noise sources at the site are vehicular traffic from Cannon Road to the south and I-5 to the west of the Specific Plan area and, to a lesser extent, occasional distant train noise from the rail line west of I-5.

Noise levels from Specific Plan-related traffic were analyzed for nearby noise-sensitive uses. The resultant noise levels would comply with the City's exterior noise criterion. No significant impacts would occur from Specific Plan-related traffic. Similarly, although specific details of the on-site uses have not yet been determined, the Specific Plan location (relatively distant from noise-sensitive receivers and adjacent to I-5) is such that impacts from operational noise would be less than significant.

Noise associated with short-term (construction) activities would result in less than significant noise and vibration impacts at nearby noise-sensitive receivers. However, construction noise would result in significant impacts to on-site biological habitat in the vicinity of major Specific Plan construction. Environmental Protection Features (EPFs) are provided that would reduce these impacts to less than significant levels.

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1 BACKGROUND AND PROJECT DESCRIPTION

The Specific Plan area consists of 203.4 acres between the south shore of the Agua Hedionda Lagoon and Cannon Road in the City of Carlsbad. The Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail (Agua Hedionda 85/15 Specific Plan or Specific Plan) is comprised of approximately 203.4 acres of land between the south shore of the Agua Hedionda Lagoon and Cannon Road in the City of Carlsbad, California. The Specific Plan will permanently protect and conserve approximately 176.7 acres for open space, the continuation of strawberry farming and coastal agricultural (more than 85% of the Specific Plan area), and will reserve approximately 26.7 acres (less than 15% of the Specific Plan area) for a new pedestrian-friendly visitor serving outdoor retail, shopping, dining and entertainment promenade, at no tax burden to the residents of Carlsbad. The Specific Plan requires that the open space lands be improved with low impact public access by providing passive recreation amenities including miles of new nature trails and walkways, picnic and rest areas, lagoon vistas, an outdoor classroom, parking and an integrated resource and educational signage program. The Outdoor Shopping, Dining and Entertainment Promenade, together with supporting uses including a farm-to-table restaurant and farm stand will provide for a total of approximately 585,000 square feet of visitor serving uses within the Specific Plan. The implementation of the Specific Plan is anticipated to occur between 2017 and 2019. This report has been prepared consistent with the Specific Plan.

The site is generally bounded by the Agua Hedionda Lagoon to the north, Cannon Road to the south and east, and I-5 to the west. Surrounding land uses include commercial, agricultural, and open space, as well as residential (see Figures 1 and 2, Regional Map and Vicinity Map). The Pacific Ocean is approximately 0.5 mile to the west. The nearest airport is McClellan-Palomar, located approximately 1.5 miles southeast of the Specific Plan area. The Specific Plan area is within the McClellan-Palomar Airport Influence Area / Airport Land Use Compatibility Plan, but is outside the airport's 60 A-weighted decibel (dBA) community noise equivalent level (CNEL) noise contour line (Ricondo & Associates Inc. 2010).

Access

The Specific Plan area is regionally accessed by I-5 and locally accessed via Cannon Road.

Construction

Construction is expected to take approximately 24 months, commencing in 2016 or 2017 and expected to be completed in 2018 or 2019. Construction of the Specific Plan would include demolition, site preparation, grading, building and parking structure construction, paving, and site

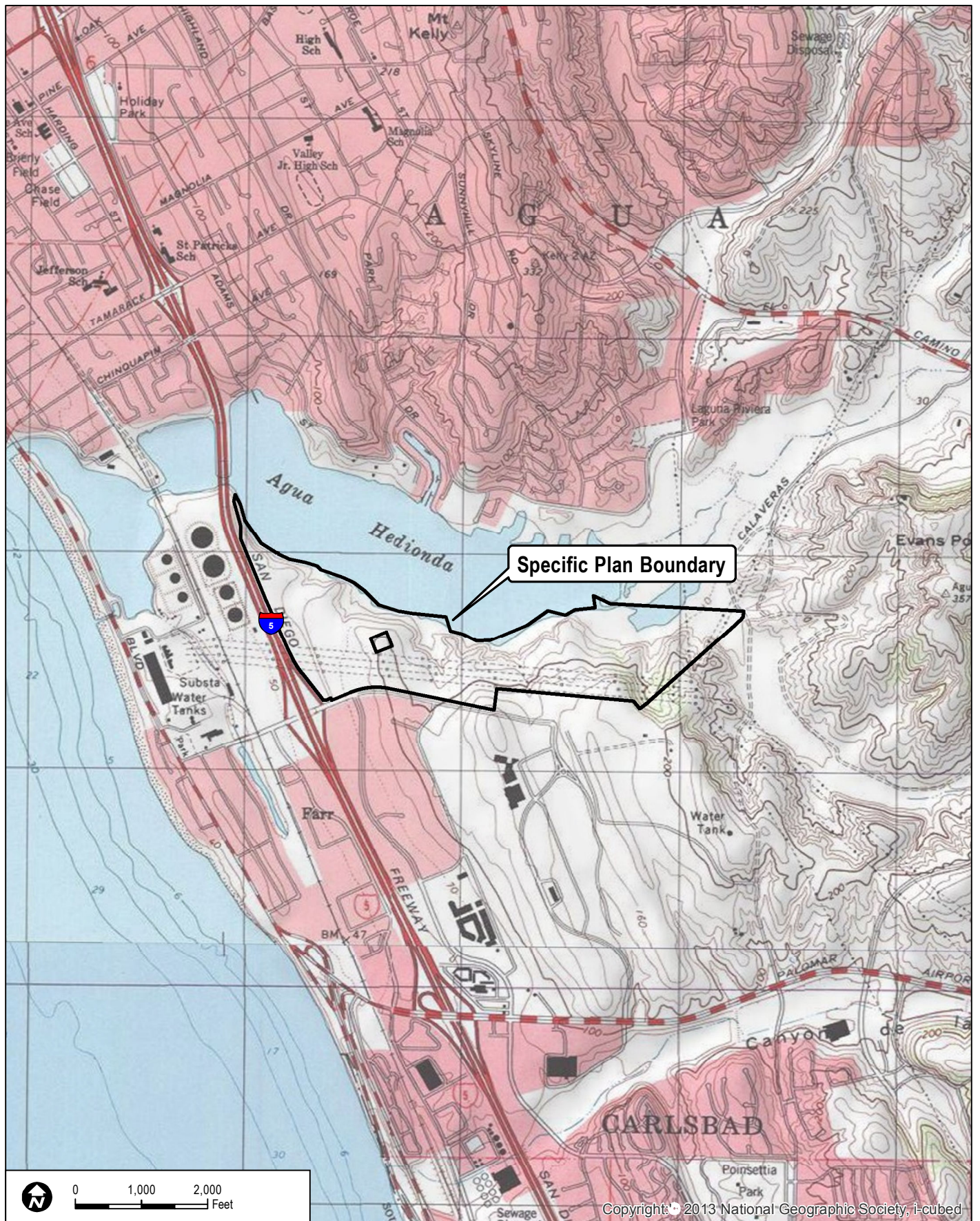
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improvements and architectural coatings. The Specific Plan would not require off-site export or import of soils. No blasting or pile driving would be necessary to construct the Specific Plan.

This noise analysis evaluates noise impacts associated with construction activities at the site and traffic noise along Cannon Road and the other major Specific Plan access routes. This analysis is based on the most recent conceptual land use plan (Dudek 2015) and traffic data (Fehr & Peers 2015).

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SOURCE: USGS 7.5-Minute Series San Luis Rey Quadrangle.

Agua Hedionda 85/15 Specific Plan Environmental Noise Assessment

FIGURE 2
Vicinity Map

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2 FUNDAMENTALS OF NOISE

The following is a brief discussion of fundamental noise concepts. The basic terminology and concepts of noise are described as follows, with technical terms defined in Appendix A to this report.

Sound, Noise, and Acoustics

Sound is actually a process that consists of three components: the sound source, the sound path, and the sound receiver. All three components must be present for sound to exist. Without a source to produce sound, there is no sound. Similarly, without a medium to transmit sound pressure waves, there is no sound. Finally, sound must be received; a hearing organ, sensor, or object must be present to perceive, register, or be affected by, sound or noise. In most situations, there are many different sound sources, paths, and receptors rather than just one of each. Acoustics is the field of science that deals with the production, propagation, reception, effects, and control of sound. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired.

Sound Pressure Levels and Decibels

The amplitude of a sound determines its loudness. Loudness of sound increases with increasing amplitude. Sound pressure amplitude is measured in units of micronewton per square meter, also called micropascal. One micropascal is approximately one-hundred billionth (0.0000000001) of normal atmospheric pressure. The pressure of a very loud sound may be 200 million micropascals, or 10 million times the pressure of the weakest audible sound. Because expressing sound levels in terms of micropascal would be very cumbersome, sound pressure level in logarithmic units is used instead to describe the ratio of actual sound pressures to a reference pressure squared. These units are called bels. To provide a finer resolution, a bel is subdivided into 10 decibels, abbreviated dB.

A-Weighted Sound Level

Sound pressure level alone is not a reliable indicator of loudness. The frequency, or pitch, of a sound also has a substantial effect on how humans will respond. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited not only in the range of audible frequencies but also in the way it perceives the sound in that range. In general, the healthy human ear is most sensitive to sounds between 1,000 hertz (Hz) and 5,000 Hz, and it perceives a sound within that range as more intense than a sound of higher or lower frequency with the same magnitude. To approximate the

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frequency response of the human ear, a series of sound level adjustments is usually applied to the sound measured by a sound level meter. The adjustments (referred to as a weighting network) are frequency dependent.

The A-scale weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments about the relative loudness or annoyance of a sound, their judgments correlate well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special situations (e.g., B-scale, C-scale, D-scale), but these scales are rarely used in conjunction with most environmental noise. Noise levels are typically reported in terms of A-weighted sound levels. All sound levels discussed in this report are A-weighted. Examples of typical noise levels for common indoor and outdoor activities are depicted in Table 1.

Table 1
Typical Sound Levels in the Environment and Industry

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet flyover at 300 meters (1,000 feet)	100	
Gas lawnmower at 1 meter (3 feet)	90	
Diesel truck at 15 meters (50 feet), at 80 kilometers/hour (50 miles per hour)	80	Food blender at 1 meter (3 feet); garbage disposal at 1 meter (3 feet)
Noisy urban area, daytime; gas lawnmower at 30 meters (100 feet)	70	Vacuum cleaner at 3 meters (10 feet)
Commercial area; heavy traffic at 90 meters (300 feet)	60	Normal speech at 1 meter (3 feet)
Quite urban daytime	50	Large business office Dishwasher next room
Quite urban nighttime	40	Theater; large conference room (background)
Quite suburban nighttime	30	Library
Quite rural nighttime	20	Bedroom at night; concert hall (background)
	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing

Source: Caltrans 1998.

Human Response to Changes in Noise Levels

Under controlled conditions in an acoustics laboratory, the trained, healthy human ear is able to discern changes in sound levels of 1 dB when exposed to steady, single-frequency signals in the mid-frequency range. Outside such controlled conditions, the trained ear can detect changes of 2 dB in normal environmental noise. It is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dB. A change of 5 dB is readily

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perceptible, and a change of 10 dB is perceived as twice or half as loud. A doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g., doubling the volume of traffic on a road) would result in a barely perceptible change in sound level, as discussed previously.

Noise Descriptors

Additional units of measure have also been developed to evaluate the long-term characteristics of sound. The equivalent sound level (L_{eq}) is also referred to as the time-average sound level. It is the equivalent steady-state sound level that in a stated period of time would contain the same acoustical energy as the time-varying sound level during the same time period. The 1-hour A-weighted equivalent sound level, $L_{eq}(h)$, is the energy average of the A-weighted sound levels occurring during a 1-hour period and is the basis for the City noise ordinance criteria.

People are generally more sensitive to and annoyed by noise occurring during the evening and nighttime hours. Thus, another noise descriptor used in community noise assessments, termed the community noise equivalent level (CNEL), was introduced. The CNEL scale represents a time-weighted, 24-hour average noise level based on the A-weighted sound level. The CNEL accounts for the increased noise sensitivity during the evening hours (7:00 p.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.) by adding 5 dB and 10 dB, respectively, to the average sound levels occurring during the nighttime hours.

Sound Propagation

Sound propagation (i.e., the passage of sound from a noise source to a receiver) is influenced by several factors. These factors include geometric spreading, ground absorption, and atmospheric effects, as well as shielding by natural and/or man-made features.

Sound levels are attenuated at a rate of approximately 6 dB per doubling of distance from an outdoor point source due to the geometric spreading of the sound waves. Additional sound attenuation can result from man-made features such as intervening walls and buildings, as well as natural features such as hills and dense woods. Atmospheric conditions such as humidity, temperature, and wind gradients can temporarily either increase or decrease sound levels. In general, the greater the distance the receiver is from the source, the greater the potential for variation in sound levels due to atmospheric effects.

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3 CITY OF CARLSBAD NOISE CRITERIA

City of Carlsbad Noise Guidelines Manual

The City's Noise Guidelines Manual is primarily intended to address community noise issues related to land use. The City's General Plan Noise Element policies are summarized, the science of noise is summarized, procedures for the processing of a project are explained, preferred methods for the mitigation of noise are listed, and a preferred noise report format is presented. Additionally, typical conditions of approval are listed. The Noise Guidelines Manual does not address noise issues such as animal noise, noise from parties and loud gatherings, motor vehicle noise, or general nuisance noise, for which the best resource is the Carlsbad Municipal Code Noise Ordinance (Carlsbad Municipal Code, Chapter 8.48).

City of Carlsbad Municipal Code

Carlsbad Municipal Code Chapter 8.48 outlines regulations for limitation of hours for construction (i.e., the erection, demolition, alteration, or repair of any building or structure or the grading or excavation of land) that creates disturbing, excessive, or offensive noise. Construction can occur Monday through Friday from 7:00 a.m. to 6:00 p.m. and Saturday 8:00 a.m. to 6:00 p.m.; no work shall be conducted on Sundays or on federal holidays. Carlsbad Municipal Code Chapter 8.48 also outlines exceptions that may be granted by the City for circumstances such as emergency repairs required to protect the health and safety of the community.

Carlsbad Municipal Code Section 21.34.090 specifies that the maximum allowable exterior noise level of any industrial use shall not exceed 65 dBA day/night average sound level (L_{dn}) as measured at the property line. If the industrial use occupies a building with more than one use, the noise level shall not be in excess of 45 dBA L_{dn} as measured within the interior space of the neighboring establishment. Similarly, the noise levels in the loading areas and docks of shopping centers should not exceed 65 dBA CNEL at the shopping center's property line, according to Carlsbad Municipal Code Section 21.31.080, Development Standards. No signs in the city shall make noise, as outlined in Carlsbad Municipal Code Section 21.41.030.

City of Carlsbad General Plan Noise Standards

The Draft Noise Element of the City's General Plan Update (City of Carlsbad 2013) includes several standards for noise.

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Community Noise Exposure





Table 2 (reproduced from City of Carlsbad 2013, Table 3.10-2) presents the community noise exposure matrix, establishing criteria the City shall use to evaluate land use compatibility based on noise emanating from all sources.

Allowable Noise Exposure

Table 3 (reproduced from City of Carlsbad 2013, Table 5-2) presents acceptable limits of noise for various land uses for both exterior and interior environments from transportation sources. Although Table 2 establishes standards to help the City establish the appropriateness of locating specific uses in noise-sensitive environments, Table 3 provides standards that construction shall attain through noise attenuation measures. These limits are based on guidelines provided by the California Office of Planning and Research. Similarly, Table 4 provides City standards for noise from non-transportation noise sources such as industrial facilities, equipment yards, automotive servicing, and on-site equipment and machinery such as heating, ventilation, and air conditioning (HVAC) equipment. These standards apply to the noise sources themselves, as measured at the edge of the property line; noise caused by motor vehicles traveling to and from the site is exempt from this standard.

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Table 2
Land Use Compatibility for Community Noise Environments

Land Use Category	Exterior Day/Night Noise Levels DNL or Ldn, dB						INTERPRETATION
	55	60	65	70	75	80	
Residential– Single Family							 <p>Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements</p>
Residential– Multiple Family							
Transient Lodging– Motels, Hotels							
Schools, Libraries, Churches, Hospitals*, Nursing Homes							 <p>Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.</p>
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Parks							 <p>Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.</p>
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing,							 <p>Clearly Unacceptable: New construction or development clearly should not be undertaken.</p>

Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1998.

*Because hospitals are often designed and constructed with high noise insulation properties, it is possible for them to be satisfactorily located in noisier areas.

Source: City of Carlsbad 2013, Table 5-1.

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Table 3
Allowable Noise Exposure¹

Land Use	Outdoor Activity ^{2,3} Areas (dBA CNEL)	Interior Spaces (dBA CNEL)
Residential	60	45
Motels, Hotels	65	45
Hospitals, Residential Care Facilities, Schools, Libraries, Museums, Churches, Day Care Facilities	65	45
Playgrounds, Parks, Recreation Uses	65	50
Commercial and Office Uses	65	50
Industrial Uses	70	65

Notes:

- ¹ Development proposed within the McClellan-Palomar Airport Area of Influence shall also be subject to the noise compatibility policies contained in the ALUCP.
- ² For non-residential uses, where an outdoor activity area is not proposed, the standard does not apply. Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving use.
- ³ Where it is not possible to reduce noise in outdoor activity areas to the allowable maximum, levels up to 5 dB higher may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
- ⁴ An exterior noise exposure level of 65 dBA CNEL is allowable for residential uses in a mixed-use project and for residential uses within the McClellan-Palomar Airport Area of Influence, pursuant to the noise compatibility policies contained in the ALUCP.

Source: City of Carlsbad, Table 5-2.

Table 4
Performance Standards for Non-Transportation Sources
(As Measured at Property Line of Source/Sensitive Use)

Noise Level Descriptor	Daytime (7 A.M. to 10 P.M.)	Nighttime (10 P.M. to 7 A.M.)
Hourly L_{eq} , dB	55	45
Maximum Level, dB	75	65

Note: Each of the noise levels specified above shall be lowered by 5 dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.

Source: City of Carlsbad, Table 5-3.

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4 METHODOLOGY

Ambient noise measurements were conducted to quantify the existing daytime noise environment at six sites. Estimated noise levels resulting from the proposed construction activities have been obtained from reports prepared by the Federal Transit Administration (FTA 2006) and field data from files. The noise impact assessment used criteria established in the City's General Plan Noise Element and Municipal Code Noise Ordinance. The noise level associated with selected roadways was determined based on ambient noise measurements and using the Federal Highway Administration's Traffic Noise Model (TNM), Version 2.5 (FHWA 2004).

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5 EXISTING CONDITIONS

The ambient noise in the Specific Plan area is primarily generated by traffic along Cannon Road and I-5. The existing average daily traffic (ADT) volume on Cannon Road adjacent to the Specific Plan area is 14,884, and the existing ADT volume on I-5 in the Specific Plan vicinity is 199,000 (Fehr & Peers 2015).

5.1 Ambient Noise Monitoring

Noise measurements were made using a SoftdB Piccolo integrating sound-level meter equipped with 0.5-inch pre-polarized condenser microphone with pre-amplifier. The sound-level meter meets the current American National Standards Institute (ANSI) standard for a Type 2 (General Purpose) sound-level meter. The sound-level meter was calibrated before and after the measurements, and the measurements were conducted with the microphone positioned 5 feet aboveground and covered with a windscreen.

Short-term noise measurements were conducted at three on-site and three site-adjacent locations between January 6 and 8, 2015, as depicted on Figure 3. Site M1 was along the northwest side of the Specific Plan area, adjacent to the lagoon; Site M2 was in the central portion of the Specific Plan area; Site M3 was near the eastern side of the Specific Plan area; Site M4 was south of the Specific Plan area, at Car Country Park and adjacent to I-5 and Paseo del Norte; Site M5 was adjacent to Cannon Road and Faraday Avenue, near the closest residential area to the Specific Plan area; and Site M6 was on the north side of the lagoon, adjacent to a residential area and a community park. The measured average noise levels ranged from approximately 51 dBA L_{eq} at Site M6 to 76 dBA L_{eq} at Site M4, as shown in Table 5.

Table 5
Measured Noise Levels and CNEL

Site	Description	L_{eq}	CNEL
M1	On site: adjacent to Agua Hedionda Lagoon in the northwestern portion of the Specific Plan area – biological habitat area	59 dBA	61 dBA
M2	On site: central portion of the Specific Plan area – potential future picnic area, adjacent biological habitat area	57 dBA	60 dBA
M3	On site: southeastern portion of the Specific Plan area – biological habitat area	53 dBA	56 dBA
M4	Off site: Car Country Park – south of site, east of I-5	76 dBA	79 dBA
M5	Off site: Cannon Road and Faraday Avenue, adjacent to residential area	68 dBA	71 dBA
M6	Off site: North side of Agua Hedionda Lagoon – residential and park area	51 dBA	54 dBA

L_{eq} = equivalent continuous sound level (time-averaged sound level); CNEL = community noise equivalent level based on diurnal noise patterns for roadways over 10,000 ADT; dBA = A-weighted decibels.

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5.2 Noise Modeling

The FHWA TNM 2.5 traffic noise prediction model was used to model noise generated by existing and future traffic along the roads (FHWA 2004). TNM 2.5 accepts as input the number and types of vehicles on the roadway, vehicle speeds, receiver locations, and other input data including noise attenuation from structures such as existing or future buildings or walls. The modeled traffic speeds were 50 miles per hour (mph) on Cannon Road, 65 mph on I-5, 35 mph on Paseo del Norte, 50 mph on Faraday Avenue, and 55 mph on El Camino Real. The noise modeling data are summarized in Chapter 6 and are included as Appendix B.



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SOURCE: Google Earth 2015

Agua Hedionda 85/15 Specific Plan Environmental Noise Assessment

FIGURE 3
Noise Measurement Locations

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6 FUTURE CONDITIONS

The Specific Plan would generate noise from short-term construction activities, and the site will primarily be affected by traffic noise along Cannon Road and I-5. The future (year 2035) peak-hour traffic volume along Cannon Road adjacent to the Specific Plan area is projected to be approximately 3,390 vehicles per hour without the Specific Plan and 4,801 vehicles per hour with the Specific Plan (Fehr & Peers 2015).

6.1 Off-Site Traffic Noise

At buildout, the Specific Plan would generate a net traffic volume increase over existing volumes. According to the Specific Plan traffic analysis conducted by Fehr & Peers (2015), the majority of the increased traffic volumes would be along Cannon Road, I-5, Paseo del Norte, and El Camino Real. As shown in Table 6, at Specific Plan completion the additional traffic would increase the noise along the adjacent roads by 1 dB or less. Therefore, the Specific Plan would not result in a substantial increase in ambient noise levels in the Specific Plan vicinity above existing levels; near-term impacts would be less than significant.

With respect to long-term (2035) impacts, as shown in Table 6, year 2035 without Specific Plan traffic noise levels would increase up to 2 dB over existing levels along portions of Cannon Road and El Camino Real and up to 4 dB over existing levels along portions of Faraday Avenue. With Specific Plan traffic, the increase in long-term CNEL levels over existing levels would be the same as without Specific Plan traffic, with the exception of a 1 dB increase along Cannon Road between Paseo del Norte and Faraday Avenue.

Noise levels from traffic were also modeled at the measurement locations M1–M6 shown in Figure 3, using TNM 2.5. The results are summarized in Table 7. As shown, on-site traffic noise levels with the Specific Plan would range from approximately 58 dBA CNEL at the biological habitat area in the southeastern portion of the Specific Plan area (M3) to 62 dBA CNEL at the future picnic area in the central portion (M2). Please note that the noise modeling does not account for structural shielding which the proposed buildings for the visitor-serving commercial use area may provide to the adjacent uses to the west, from I-5 noise. The biological habitat areas may receive some reduction of I-5 noise from the intervening structures. Off-site traffic noise levels in the future with Specific Plan condition would range from approximately 54 dBA CNEL at the residential area north of the lagoon (M4) to 79 dBA CNEL at Car Country Park (M4).

As shown in Table 7, existing with Specific Plan traffic would result in an increase of 1 dB or less relative to existing noise levels. Similarly, future with Specific Plan traffic would result in an increase of 2 dB or less relative to existing noise levels, and 1 dB or less relative to future without Specific Plan noise levels. Therefore, the Specific Plan would not result in a substantial

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increase in ambient noise levels in the Specific Plan vicinity above existing levels. In addition, the Specific Plan would not cause an exceedance of City noise/land use compatibility standards. Therefore, the noise level increase associated with the Specific Plan would be less than significant.

Table 6
Off-Site Traffic Noise Level Increase per Street (Segment)

Street (Segment)	Existing Pk-Hr Volume (ADT for I-5)	Existing + Specific Plan Pk-Hr Volume (ADT for I-5)	CNEL Increase ¹ (dB)	Long- Term (2035) Without Specific Plan Pk-Hr Volume (ADT for I-5)	CNEL Increase ² (dB)	Long-Term (2035) With Specific Plan Pk-Hr Volume (ADT for I-5)	CNEL Increase ³ (dB)
<i>Cannon Road</i>							
Carlsbad Blvd to Avenida Encinas	844	946	<1	1,180	1	1,282	1
Avenida Encinas to I-5	1,292	1,420	<1	1,630	<1	1,758	<1
I-5 to Paseo del Norte	2,663	4,074	<1	3,390	<1	4,801	1
Paseo del Norte to Legoland Drive	2,091	2,705	1	2,610	1	3,224	2
Legoland Drive to Faraday Avenue	1,899	2,300	1	2,350	1	2,751	2
Faraday Avenue to El Camino Real	1,270	1,561	<1	2,160	2	2,451	2
<i>Paseo del Norte</i>							
Cannon Road to Palomar Airport Road	952	1,191	<1	1,365	<1	1,605	1
<i>Faraday Avenue</i>							
Cannon Road to College Boulevard	994	1,103	1	2,070	4	2,179	4
<i>El Camino Real</i>							
Tamarack Avenue to Cannon Road	2,499	2,645	<1	4,435	2	4,581	2
Cannon Road to Palomar Airport Road	3,951	3,988	<1	5,825	1	5,862	1
<i>I-5</i>							
Palomar Airport Road to Cannon Road	198,000	203,783	<1	252,200	<1	257,983	<1
Cannon Road to Tamarack Avenue	199,000	204,301	<1	245,500	<1	250,801	<1

Notes: Pk-Hr = peak hour; ADT = average daily traffic; CNEL = community noise equivalent level; dB = decibel(s).

¹ Existing plus Specific Plan noise levels relative to existing levels.

² Long-term (2035) noise levels without Specific Plan relative to existing levels.

³ Long-term (2035) noise levels with Specific Plan relative to existing levels.

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

Table 7
Traffic Noise Model Results at Representative Receivers

Receiver	Traffic Noise (CNEL dBA)			
	Existing	Existing with Specific Plan	Future	Future with Specific Plan
M1: Biological Habitat Area – northwestern Specific Plan area	61	61	61	61
M2: Future Picnic Area – central Specific Plan area	60	61	61	62
M3: Biological Habitat Area – southeastern Specific Plan area	56	57	57	58
M4: Car Country Park	79	79	79	79
M5: Cannon Road / Faraday Avenue	60	61	62	62
M6: Residences north of lagoon	54	54	54	54

CNEL = community noise equivalent level; dBA = A-weighted decibels.

6.2 On-Site Operational Noise

For the most part, on-site activities related to the Specific Plan would be passive in nature (e.g., hiking, wildlife viewing, picnic areas) and therefore would result in relatively low noise levels, particularly in the eastern portions of the Specific Plan area. In the western portion of the Specific Plan area, visitor commercial/retail uses, restaurants, and entertainment uses are envisioned. These uses are more active in nature, with commensurately higher noise levels. It is anticipated that as with many projects, two of the louder sources of on-site noise would be noise from parking lots and/or parking structures and mechanical noise from HVAC equipment.

Table 8 provides estimates of the maximum noise levels associated with common parking lot activities. The noise levels are presented at a distance of 50 feet from the source and represent the maximum noise level generated. A range is given to reflect the variability of noise generated by various automobile types and driving styles.

Table 8
Typical Noise Levels Resulting from Parking Lot Activities

Event	Maximum Noise Level at 50 Feet (dBA L _{max})
Door slamming	60–70
Engine starting up ¹	60–70
Car passing by ²	55–70

Source: Mestre-Greve Associates 2011.

Notes: dBA = A-weighted decibels; L_{max} = maximum sound level.

¹ Higher values from poor muffler systems.

² Typical values were in the low 60s.

At the nearest noise-sensitive receivers to the visitor-serving commercial portions of the Specific Plan area, noise levels would be well below the ambient noise levels. For example, at the

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

residential area north of the Agua Hedionda Lagoon, the maximum noise level would be approximately 37 dBA or less. At the hotel located to the west of the Specific Plan area (and west of I-5), the maximum noise level would be approximately 50 dBA or less; average parking lot noise levels would be lower. The noise from the intervening I-5 would render noise from the Specific Plan area inaudible.

On-site stationary equipment, such as HVAC equipment, could be mounted on rooftops or at ground level. The specific details (sizes, manufacturers, and models) of the equipment have not yet been determined. The noise levels generated by this equipment would vary, but would typically range from approximately 45 dBA to 55 dBA at a distance of 50 feet. At the residences north of the lagoon, the HVAC noise could range from approximately 12 to 22 dBA, which is well below ambient noise levels.

All on-site uses would be subject to City General Plan and Municipal Code noise standards. Noise from on-site operational activities would thus be less than significant.

6.3 Construction Noise

Construction noise and vibration are temporary phenomena. Construction noise and vibration levels will vary from hour to hour and day to day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor.

As described in Chapter 1, total construction is expected to take approximately 24 months, and would include demolition of existing on-site structures, grading, garage construction, building construction, coatings, and paving. Potential noise effects from construction activities were assessed using a standard reference for construction noise (EPA 1971). Although specific construction details and equipment fleet specifications for the Specific Plan are not available at this time, the following are typical types of construction equipment that would be expected:

- Concrete/industrial saws
- Crawler tractors
- Tractors/loaders/backhoes
- Excavators
- Forklifts
- Welders
- Cement and mortar mixers
- Cranes
- Off-highway water trucks
- Generator sets
- Paving equipment
- Trenching equipment
- Off-highway water trucks
- Pneumatic tools
- Graders
- Air compressors

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

Construction equipment with substantially higher noise-generation characteristics (such as pile drivers, rock drills, blasting equipment) would not be necessary for the Specific Plan.

Construction noise is difficult to quantify because of the many variables involved, including the specific equipment types, size of equipment used, percentage of time in use, condition of each piece of equipment, and number of pieces of equipment that will actually operate on site. The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in **Table 9**. The noise values represent maximum noise generation, or full-power operation of the equipment. As an example, a loader and two dozers, all operating at full power and relatively close together, would generate a maximum sound level of approximately 90 dBA at 50 feet from their operations. As one increases the distance between equipment and/or the separation of areas with simultaneous construction activity, dispersion and distance attenuation reduce the effects of separate noise sources added together. In addition, typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes at lower levels. The average noise level during construction activities is generally lower, since maximum noise generation may only occur up to 50% of the time.

Table 9
Construction Equipment Noise Emission Levels

Equipment	Typical Sound Level (dBA) 50 Feet from Source
Pump	76
Saw	76
Backhoe	80
Air compressor	81
Generator	81
Compactor	82
Concrete pump	82
Crane, mobile	83
Compactor	82
Concrete mixer	85
Grader	85
Loader	85
Paver	89
Pneumatic tool	85
Truck	88
Truck	88

Source: FTA 2006.

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

6.4 Construction Noise Impact to Off-Site Receivers

The off-site existing noise-sensitive receivers closest to the construction area for Specific Plan buildings and facilities are single-family residences located approximately 1,700 feet north of the Specific Plan area, on the north side of Agua Hedionda Lagoon. A hotel is located west of I-5 approximately 700 feet west of planned construction in the western portion of the Specific Plan area and multiple-family residences are located approximately 250 feet east of the eastern boundary of the Specific Plan area; however, active construction work would be very limited in the eastern portion of the Specific Plan area and construction is not anticipated to involve the use of heavy machinery.

Routine noise levels from conventional construction activities (with typical numbers of equipment operating on the site) range from 75 to 86 dBA L_{eq} at a distance of 50 feet. Due to improvements in construction equipment silencing technology, these sound levels are 3 dB lower than the noise levels reported in the 1971 reference study. Typically, the quietest phase of building site construction for similar projects is that associated with constructing foundations, producing 75 dBA L_{eq} at a distance of 50 feet. Typically, the loudest phases, producing 86 dBA L_{eq} at 50 feet, are those associated with grading and finishing activities. Noise levels from construction activities generally decrease at a rate of 6 dB per doubling of distance away from the activity. Thus, at a distance of 100 feet from the center of construction activities, construction noise levels would range from 69 to 80 dBA L_{eq} . At a distance of 500 feet from the center of construction activities, construction noise would range from 55 to 66 dBA L_{eq} . At a distance of 1,000 feet, construction noise could range up to 48 dBA L_{eq} to 60 dBA L_{eq} , but would likely be lower due to additional attenuation from ground effects, air absorption, and shielding from miscellaneous intervening structures.

At the nearest residential uses north of the Specific Plan, noise levels from construction would be approximately 42 to 53 dBA L_{eq} . Based on the ambient noise measurements conducted in the area, these levels would be audible but would not interfere with conversation or normal activities. Similarly, at the hotel west of the Specific Plan area, noise levels from construction would range from approximately 53 to 64 dBA L_{eq} , which may be audible but would largely be acoustically masked by the intervening I-5.

The City's Noise Control Ordinance provides guidance regarding permitted hours for construction activities (Monday through Friday from 7:00 a.m. to 6:00 p.m., Saturday 8:00 a.m. to 6:00 p.m.; and no work on Sundays or federal holidays). The work conducted as part of the Specific Plan would take place within these hours. Accordingly, the Specific Plan would not result in exposure of persons to, or generation of noise levels in excess of, standards established

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

in the City's Noise Control Ordinance or other applicable noise standards. Construction noise would have less than significant impacts.

Construction Noise at Biological Habitat

As part of the Specific Plan, biological habitat areas would constitute a significant portion of the Specific Plan area. Additionally, the visitor-serving commercial use site would include a biological habitat zone along its northern boundary. As discussed in greater detail in the Biological Technical Report for this Specific Plan, nesting birds can be significantly affected by short-term construction-related noise, resulting in decreased reproductive success or abandonment of an area as nesting habitat. Breeding passerine and raptor species likely use the various habitats on site for nest construction and foraging. Indirect impacts from construction-related noise may occur to sensitive wildlife if construction occurs during the breeding season (February 15 through September 1).

The City's Guidelines for Wetland and Riparian Buffers include Minimization Measure 6, Noise Abatement, which states that construction noise shall not exceed 60 dBA L_{eq} within the riparian/wetland habitat and buffer. If riparian/wetland habitat or buffer is occupied by sensitive species, species-specific conditions pursuant to the Habitat Management Plan and state and federal laws must be met. In addition, the Guidelines for Wetland and Riparian Buffers state that construction noise levels at the riparian canopy edge where least Bell's vireo (*Vireo bellii pusillus*) occur shall be kept below 60 dBA L_{eq} from 5:00 a.m. to 11:00 a.m. during the peak nesting period of March 15 to July 15. For the balance of the day/season, the noise levels shall not exceed 60 dBA, averaged over a 1-hour period (i.e., $L_{eq}(h)$). Noise levels shall be monitored and monitoring reports shall be provided to the City, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife.

Detailed site plans have not yet been prepared for the Specific Plan; however, it is likely that construction activities could take place relatively near (within approximately 50 feet of) biological habitat. Assuming this is the case, noise levels from construction could be as high as 86 dBA L_{eq} during the loudest phases of construction. Biological habitat areas within 1,000 feet of the construction area could experience noise levels exceeding 60 dBA L_{eq} . This is considered a significant impact. EPFs are provided for this impact in Chapter 7.

6.5 Construction Vibration Impact to Adjacent Off-Site Residences

The heavier pieces of construction equipment used at this site would include bulldozers, graders, loaded trucks, water trucks, and pavers. Ground-borne vibration information related to construction activities has been collected by the California Department of Transportation

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

(Caltrans) (Caltrans 2004). Based on published vibration data, the anticipated construction equipment would generate a peak particle velocity of approximately 0.09 inch/second or less at a distance of 25 feet (FTA 2006). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inch/second begin to annoy people. Ground-borne vibration is typically attenuated over short distances. The closest existing residences would be approximately 1,700 feet or more from the construction area, and the nearby hotel would be approximately 700 feet from Specific Plan construction. At these distances, the peak particle velocity from construction would be well below 0.1 inch/second and would also be below the threshold of perceptibility. Therefore, impacts related to vibration from construction activities would be less than significant.

Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

7 ENVIRONMENTAL PROTECTION FEATURES

This section summarizes the environmental protection features (EPFs) that are part of the Specific Plan. The Specific Plan's EPFs are intended to avoid or substantially reduce all potential environmental effects to the maximum extent feasible, and the City retains full authority to enforce each of the Specific Plan EPFs.

EPF NOI-1 Prior to the issuance of a grading permit, the Specific Plan applicant shall ensure that:

- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers.
- Temporary sound barriers / shielding shall be installed. This may comprise shielding of equipment in the vicinity of non-mobile equipment where this is the source, or alternatively, shielding at the site boundaries (i.e., the northern, southern, and eastern sides, where adjacent residences are closest).
- Construction noise reduction methods, such as shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and using electric air compressors and similar power tools rather than diesel equipment, where feasible.
- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from or shielded from sensitive noise receivers.
- During construction, stockpiling and vehicle staging areas shall be located as far as practical from noise-sensitive receptors.
- Construction activities within the Specific Plan area shall be limited to the following hours: Monday through Friday from 7 a.m. to 6 p.m. and Saturday 8 a.m. to 6 p.m. No work shall occur on Sundays or federal holidays.

EPF NOI-2 The following noise control measure represents a best practice to reduce construction noise at adjacent biological habitat areas:

Construction shall not occur within a 500-foot buffer of biological habitat areas during the breeding season (February 15 through September 1); alternatively, measures (such as installation of temporary noise barriers if needed) will be taken to ensure that noise levels from construction do not exceed either the ambient noise level or 60 A-weighted decibels equivalent sound level, whichever is greater.

**Environmental Noise Assessment Report for the Agua Hedionda
South Shore Specific Plan for 85% Open Space and 15% Retail**

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Environmental Noise Assessment Report for the Agua Hedionda South Shore Specific Plan for 85% Open Space and 15% Retail

8 REFERENCES

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- Caltrans. 2004. *Transportation- and Construction-Induced Vibration Guidance Manual*. Sacramento, California: Caltrans Noise, Vibration and Hazardous Waste Management Office. June 2004
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South Shore Specific Plan for 85% Open Space and 15% Retail**

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APPENDIX A

Definitions

APPENDIX A

Definitions

TERM

DEFINITION

Ambient Noise Level

The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

A-Weighted Sound Level (dBA)

The sound pressure level in decibels as measured on a sound-level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.

Community Noise Equivalent Level (CNEL)

CNEL is the A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.) and a 5 dB adjustment added to the sound levels occurring during the evening hours (7 p.m. to 10 p.m.).

Decibel (dB)

A unit for measuring sound pressure level, equal to 10 times the logarithm to the base 10 of the ratio of the measured sound pressure squared to a reference pressure, which is 20 micropascals.

Equivalent Sound Level (L_{eq})

The sound level corresponding to a steady-state sound level and containing the same total energy as a time varying signal over a given sample period. L_{eq} is designed to average all of the loud and quiet sound levels occurring over a specific time period.

APPENDIX A (Continued)

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APPENDIX B

Noise Modeling Input/Output

INPUT: BARRIERS

8707

Dudek																			
M Greene																			
INPUT: BARRIERS																			
PROJECT/CONTRACT:	8707																		
RUN:	Cannon Road Project - Existing																		
Barrier																			
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)		Height	Segment					
		Min	Max	\$ per	\$ per	Top	Run:Rise	\$ per		X	Y	Z	at	Seg Ht	Perturbs	On	Important		
				Unit	Unit	Width		Unit					Point	Incre-	#Up	#Dn	Struct?	Reflec-	
				Area	Vol.			Length						ment			tions?		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft		ft	ft	ft	ft	ft	ft				
Barrier3	W	0.00	99.99	0.00				0.00	point4	4	10,020.0	2,725.0	118.00	5.00	0.00	0	0		
									point5	5	10,020.0	2,920.0	118.00	5.00	0.00	0	0		
									point6	6	10,450.0	2,920.0	118.00	5.00					

INPUT: RECEIVERS
8707

Dudek						4 March 2015						
M Greene						TNM 2.5						
INPUT: RECEIVERS												
PROJECT/CONTRACT:	8707											
RUN:	Cannon Road Project - Existing											
Receiver												
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active	
			X	Y	Z	above	Existing	Impact Criteria		NR	in	
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.	
			ft	ft	ft	ft	dBA	dBA	dB	dB		
M1 - Bio Habitat	1	1	4,350.0	4,900.0	100.00	5.00	0.00	66	10.0	8.0	Y	
M2 - Future Picnic Area	3	1	5,600.0	3,400.0	100.00	5.00	0.00	66	10.0	8.0	Y	
M3 - Bio Habitat	5	1	8,060.0	3,525.0	100.00	5.00	0.00	66	10.0	8.0	Y	
M4 - Car Country Park	6	1	3,250.0	1,500.0	100.00	5.00	0.00	66	10.0	8.0	Y	
M5 - Cannon Rd / Faraday Ave	7	1	10,060.0	2,885.0	120.00	5.00	0.00	66	10.0	8.0	Y	
M6 - Resi's N of Lagoon	8	1	5,200.0	5,700.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R1 Cannon Rd - Crlsbd Blvd to Ave Encns	9	1	2,000.0	2,900.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R2 Cannon Rd - Ave Encns to I-5	10	1	2,600.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R3 Cannon Road - I5 to Paseo del Norte	14	1	3,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R4 CannonRd-PaseodelNortetoLegoland	16	1	5,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R5 CannonRd-Legoland DrtoFaraday Av	17	1	8,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R6 CannonRd-Faraday Av to El CmnoRea	19	1	12,000.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R7 Faraday Ave Cannon Rd to College Bl	20	1	10,000.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R8 El Camino Real Cannon Rd to College	21	1	14,400.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y	
R9 El Camino Real Tamarack Ave to Can	22	1	14,400.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y	

INPUT: ROADWAYS
8707

Dudek					4 March 2015						
M Greene					TNM 2.5						
INPUT: ROADWAYS							Average pavement type shall be used unless				
PROJECT/CONTRACT:		8707					a State highway agency substantiates the use				
RUN:		Cannon Road Project - Existing					of a different type with the approval of FHWA				
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)		Flow Control			Segment		
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Cannon Road - I5 to Paseo del Norte	85.0	point1	1	3,110.0	3,000.0	100.00				Average	
		point2	2	3,900.0	3,000.0	100.00					
I-5 NB S of Cannon Rd	65.0	point3	3	3,100.0	2,990.0	100.00				Average	
		point4	4	3,100.0	1,000.0	100.00					
I-5 SB N of Cannon Rd	65.0	point7	7	3,000.0	7,000.0	100.00				Average	
		point8	8	3,000.0	3,000.0	100.00					
I-5 SB S of Cannon Rd	65.0	point9	9	3,000.0	2,990.0	100.00				Average	
		point10	10	3,000.0	1,000.0	100.00					
Cannon Rd-Crslbd Blvd to Ave Encns	80.0	point11	11	1,400.0	3,000.0	100.00				Average	
		point17	17	2,400.0	3,000.0	100.00					
CannonRd-PaseodelNortetoLegoland Dr	85.0	point13	13	3,910.0	3,000.0	100.00				Average	
		point19	19	6,905.0	3,000.0	100.00					
Paseo del Norte - S of Cannon Rd	60.0	point15	15	3,900.0	2,990.0	100.00				Average	
		point33	33	3,900.0	2,492.5	100.00				Average	
		point34	34	3,300.0	1,800.0	100.00				Average	
		point35	35	3,300.0	1,400.0	100.00				Average	
		point16	16	3,300.0	950.0	100.00					
Cannon Rd- Ave Encns to I-5	80.0	point18	18	2,450.0	3,000.0	100.00				Average	
		point12	12	2,990.0	3,000.0	100.00					
CannonRd-Legoland DrtoFaraday Av	85.0	point20	20	6,910.0	3,000.0	100.00				Average	
		point14	14	9,900.0	3,000.0	100.00					
CannonRd-Faraday Av to El CmnoReal	85.0	point23	23	9,905.0	3,000.0	100.00				Average	
		point24	24	14,500.0	3,000.0	100.00					
Faraday Ave Cannon Rd to College Blvd	70.0	point25	25	9,900.0	2,995.0	100.00				Average	
		point26	26	9,900.0	1,000.0	100.00					
El Camino Real Tamarack Ave to Cann	110.0	point27	27	14,500.0	6,000.0	100.00				Average	
		point28	28	14,500.0	3,050.0	100.00					

INPUT: ROADWAYS

8707

I-5 NB N of Cannon Rd	85.0	point36	36	3,100.0	7,000.0	100.00				Average	
		point37	37	3,100.0	3,000.0	100.00					
El Camino Real Cannon Rd to College	110.0	point38	38	14,500.0	1,000.0	100.00				Average	
		point39	39	14,500.0	2,990.0	100.00					

8707

4 March 2015
TNM 2.5
Calculated with TNM 2.5

8707

Cannon Road Project - Existing

INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

68 deg F, 50% RH

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C:\TNM25\Projects\Cannon Road Project Carlsbad\Existing

INPUT: TRAFFIC FOR LAeq1h Percentages
8707

Dudek													
M Greene													

4 March 2015
TNM 2.5
INPUT: TRAFFIC FOR LAeq1h Percentages
PROJECT/CONTRACT: 8707
RUN: Cannon Road Project - Existing

Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Cannon Road - I5 to Paseo del Norte	point1	1	2663	97	50	2	50	1	50	0	0	0	0
	point2	2											
I-5 NB S of Cannon Rd	point3	3	9900	95	65	2	65	3	65	0	0	0	0
	point4	4											
I-5 SB N of Cannon Rd	point7	7	9950	95	65	2	65	3	65	0	0	0	0
	point8	8											
I-5 SB S of Cannon Rd	point9	9	9900	95	65	2	65	3	65	0	0	0	0
	point10	10											
Cannon Rd-Crsld Blvd to Ave Encns	point11	11	844	97	50	2	50	1	50	0	0	0	0
	point17	17											
CannonRd-PaseodelNortetoLegoland Dr	point13	13	2091	97	50	2	50	1	50	0	0	0	0
	point19	19											
Paseo del Norte - S of Cannon Rd	point15	15	952	97	35	2	35	1	35	0	0	0	0
	point33	33	952	97	35	2	35	1	35	0	0	0	0
	point34	34	952	97	35	2	35	1	35	0	0	0	0
	point35	35	952	97	35	2	35	1	35	0	0	0	0
	point16	16											
Cannon Rd- Ave Encns to I-5	point18	18	1292	97	50	2	50	1	50	0	0	0	0
	point12	12											
CannonRd-Legoland DrtoFaraday Av	point20	20	1899	97	50	2	50	1	50	0	0	0	0
	point14	14											
CannonRd-Faraday Av to El CmnoReal	point23	23	1270	97	50	2	50	1	50	0	0	0	0
	point24	24											
Faraday Ave Cannon Rd to College Blvd	point25	25	994	97	50	2	50	1	50	0	0	0	0
	point26	26											

INPUT: TRAFFIC FOR LAeq1h Percentages**8707**

El Camino Real Tamarack Ave to Cann	point27	27	2499	97	55	2	55	1	55	0	0	0	0
	point28	28											
I-5 NB N of Cannon Rd	point36	36	9950	95	65	2	65	3	65	0	0	0	0
	point37	37											
El Camino Real Cannon Rd to College	point38	38	3951	97	55	2	55	1	55	0	0	0	0
	point39	39											

INPUT: BARRIERS

8707

Dudek																			
M Greene																			
INPUT: BARRIERS																			
PROJECT/CONTRACT:	8707																		
RUN:	Cannon Road Project - Existing w Proj																		
Barrier																			
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)		Height	Segment					
		Min	Max	\$ per	\$ per	Top	Run:Rise	\$ per		X	Y	Z	at	Seg Ht	Perturbs	On	Important		
				Unit	Unit	Width		Unit					Point	Incre-	#Up	#Dn	Struct?	Reflec-	
				Area	Vol.			Length						ment			tions?		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft		ft	ft	ft	ft	ft	ft				
Barrier2	W	0.00	99.99	0.00				0.00	point4	4	10,020.0	2,725.0	118.00	5.00	0.00	0	0		
									point5	5	10,020.0	2,920.0	118.00	5.00	0.00	0	0		
									point6	6	10,450.0	2,920.0	118.00	5.00					

INPUT: RECEIVERS
8707

Dudek						4 March 2015					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	8707										
RUN:	Cannon Road Project - Existing w Proj										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1 - Bio Habitat	1	1	4,350.0	4,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2 - Future Picnic Area	3	1	5,600.0	3,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3 - Bio Habitat	5	1	8,060.0	3,525.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4 - Car Country Park	6	1	3,250.0	1,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5 - Cannon Rd / Faraday Ave	7	1	10,060.0	2,885.0	120.00	5.00	0.00	66	10.0	8.0	Y
M6 - Resi's N of Lagoon	8	1	5,200.0	5,700.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1 Cannon Rd - Crlsbd Blvd to Ave Encns	9	1	2,000.0	2,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 Cannon Rd - Ave Encns to I-5	10	1	2,600.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 Cannon Road - I5 to Paseo del Norte	14	1	3,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 CannonRd-PaseodelNortetoLegoland	16	1	5,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 CannonRd-Legoland DrtoFaraday Av	17	1	8,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 CannonRd-Faraday Av to El CmnoRea	19	1	12,000.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 Faraday Ave Cannon Rd to College Bl	20	1	10,000.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 El Camino Real Cannon Rd to College	21	1	14,400.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 El Camino Real Tamarack Ave to Can	22	1	14,400.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y

INPUT: ROADWAYS
8707

Dudek					4 March 2015						
M Greene					TNM 2.5						
INPUT: ROADWAYS							Average pavement type shall be used unless				
PROJECT/CONTRACT:		8707					a State highway agency substantiates the use				
RUN:		Cannon Road Project - Existing w Proj					of a different type with the approval of FHWA				
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Cannon Road - I5 to Paseo del Norte	85.0	point1	1	3,110.0	3,000.0	100.00				Average	
		point2	2	3,900.0	3,000.0	100.00					
I-5 NB S of Cannon Rd	65.0	point3	3	3,100.0	2,990.0	100.00				Average	
		point4	4	3,100.0	1,000.0	100.00					
I-5 SB N of Cannon Rd	65.0	point7	7	3,000.0	7,000.0	100.00				Average	
		point8	8	3,000.0	3,000.0	100.00					
I-5 SB S of Cannon Rd	65.0	point9	9	3,000.0	2,990.0	100.00				Average	
		point10	10	3,000.0	1,000.0	100.00					
Cannon Rd-Crslbd Blvd to Ave Encns	80.0	point11	11	1,400.0	3,000.0	100.00				Average	
		point17	17	2,400.0	3,000.0	100.00					
CannonRd-PaseodelNortetoLegoland Dr	85.0	point13	13	3,910.0	3,000.0	100.00				Average	
		point19	19	6,905.0	3,000.0	100.00					
Paseo del Norte - S of Cannon Rd	60.0	point15	15	3,900.0	2,990.0	100.00				Average	
		point33	33	3,900.0	2,492.5	100.00				Average	
		point34	34	3,300.0	1,800.0	100.00				Average	
		point35	35	3,300.0	1,400.0	100.00				Average	
		point16	16	3,300.0	950.0	100.00					
Cannon Rd- Ave Encns to I-5	80.0	point18	18	2,450.0	3,000.0	100.00				Average	
		point12	12	2,990.0	3,000.0	100.00					
CannonRd-Legoland DrtoFaraday Av	85.0	point20	20	6,910.0	3,000.0	100.00				Average	
		point14	14	9,900.0	3,000.0	100.00					
CannonRd-Faraday Av to El CmnoReal	85.0	point23	23	9,905.0	3,000.0	100.00				Average	
		point24	24	14,500.0	3,000.0	100.00					
Faraday Ave Cannon Rd to College Blvd	70.0	point25	25	9,900.0	2,995.0	100.00				Average	
		point26	26	9,900.0	1,000.0	100.00					
El Camino Real Tamarack Ave to Cann	110.0	point27	27	14,500.0	6,000.0	100.00				Average	
		point28	28	14,500.0	3,050.0	100.00					

INPUT: ROADWAYS

8707

I-5 NB N of Cannon Rd	85.0	point36	36	3,100.0	7,000.0	100.00				Average	
		point37	37	3,100.0	3,000.0	100.00					
El Camino Real Cannon Rd to College	110.0	point38	38	14,500.0	1,000.0	100.00				Average	
		point39	39	14,500.0	2,990.0	100.00					

RESULTS: SOUND LEVELS
8707

Dudek														
M Greene														
RESULTS: SOUND LEVELS														
PROJECT/CONTRACT:														
RUN:														
BARRIER DESIGN:														
ATMOSPHERICS:														
Receiver														
Name		No.	#DUs	Existing	No Barrier	Increase over existing			Type	With Barrier	Noise Reduction			
				LAeq1h	LAeq1h					Calculated				
					Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated	
								Sub'l Inc					minus	
													Goal	
				dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
M1 - Bio Habitat		1	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0	
M2 - Future Picnic Area		3	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0	
M3 - Bio Habitat		5	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0	
M4 - Car Country Park		6	1	0.0	78.8	66	78.8	10	Snd Lvl	78.8	0.0	8	-8.0	
M5 - Cannon Rd / Faraday Ave		7	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0	
M6 - Resi's N of Lagoon		8	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0	
R1 Cannon Rd - Crlsbd Blvd to Ave Encns		9	1	0.0	67.3	66	67.3	10	Snd Lvl	67.3	0.0	8	-8.0	
R2 Cannon Rd - Ave Encns to I-5		10	1	0.0	72.2	66	72.2	10	Snd Lvl	72.2	0.0	8	-8.0	
R3 Cannon Road - I5 to Paseo del Norte		14	1	0.0	74.3	66	74.3	10	Snd Lvl	74.3	0.0	8	-8.0	
R4 CannonRd-PaseodelNortetoLegoland D		16	1	0.0	69.8	66	69.8	10	Snd Lvl	69.8	0.0	8	-8.0	
R5 CannonRd-Legoland DrtoFaraday Av		17	1	0.0	69.0	66	69.0	10	Snd Lvl	69.0	0.0	8	-8.0	
R6 CannonRd-Faraday Av to El CmnoReal		19	1	0.0	67.4	66	67.4	10	Snd Lvl	67.4	0.0	8	-8.0	
R7 Faraday Ave Cannon Rd to College Blv		20	1	0.0	65.8	66	65.8	10	----	65.8	0.0	8	-8.0	
R8 El Camino Real Cannon Rd to College		21	1	0.0	72.8	66	72.8	10	Snd Lvl	72.8	0.0	8	-8.0	
R9 El Camino Real Tamarack Ave to Cann		22	1	0.0	71.0	66	71.0	10	Snd Lvl	71.0	0.0	8	-8.0	
Dwelling Units			# DUs	Noise Reduction										
				Min	Avg	Max								
				dB	dB	dB								
All Selected			15	0.0	0.0	0.0								
All Impacted			9	0.0	0.0	0.0								
All that meet NR Goal			0	0.0	0.0	0.0								

8707

[illegible]

INPUT: TRAFFIC FOR LAeq1h Percentages**8707**

El Camino Real Tamarack Ave to Cann	point27	27	2645	97	55	2	55	1	55	0	0	0	0
	point28	28											
I-5 NB N of Cannon Rd	point36	36	9950	95	65	2	65	3	65	0	0	0	0
	point37	37											
El Camino Real Cannon Rd to College	point38	38	3988	97	55	2	55	1	55	0	0	0	0
	point39	39											

INPUT: BARRIERS

8707

Dudek																			
M Greene																			
INPUT: BARRIERS																			
PROJECT/CONTRACT:	8707																		
RUN:	Cannon Road Project - Future																		
Barrier																			
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)		Height	Segment					
		Min	Max	\$ per	\$ per	Top	Run:Rise	\$ per		X	Y	Z	at	Seg Ht	Perturbs	On	Important		
				Unit	Unit	Width		Unit					Point	Incre-	#Up	#Dn	Struct?	Reflec-	
				Area	Vol.			Length						ment			tions?		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft		ft	ft	ft	ft	ft	ft				
Barrier3	W	0.00	99.99	0.00				0.00	point4	4	10,020.0	2,725.0	118.00	5.00	0.00	0	0		
									point5	5	10,020.0	2,920.0	118.00	5.00	0.00	0	0		
									point6	6	10,450.0	2,920.0	118.00	5.00					

INPUT: RECEIVERS
8707

Dudek						4 March 2015					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	8707										
RUN:	Cannon Road Project - Future										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1 - Bio Habitat	1	1	4,350.0	4,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2 - Future Picnic Area	3	1	5,600.0	3,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3 - Bio Habitat	5	1	8,060.0	3,525.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4 - Car Country Park	6	1	3,250.0	1,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5 - Cannon Rd / Faraday Ave	7	1	10,060.0	2,885.0	120.00	5.00	0.00	66	10.0	8.0	Y
M6 - Resi's N of Lagoon	8	1	5,200.0	5,700.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1 Cannon Rd - Crlsbd Blvd to Ave Encns	9	1	2,000.0	2,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 Cannon Rd - Ave Encns to I-5	10	1	2,600.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 Cannon Road - I5 to Paseo del Norte	14	1	3,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 CannonRd-PaseodelNortetoLegoland	16	1	5,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 CannonRd-Legoland DrtoFaraday Av	17	1	8,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 CannonRd-Faraday Av to El CmnoRea	19	1	12,000.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 Faraday Ave Cannon Rd to College Bl	20	1	10,000.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 El Camino Real Cannon Rd to College	21	1	14,400.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 El Camino Real Tamarack Ave to Can	22	1	14,400.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y

INPUT: ROADWAYS
8707

Dudek											
M Greene											
INPUT: ROADWAYS				4 March 2015							
PROJECT/CONTRACT:				TNM 2.5							
RUN:				Cannon Road Project - Future				Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA			
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Cannon Road - I5 to Paseo del Norte	85.0	point1	1	3,110.0	3,000.0	100.00				Average	
		point2	2	3,900.0	3,000.0	100.00					
I-5 NB S of Cannon Rd	65.0	point3	3	3,100.0	2,990.0	100.00				Average	
		point4	4	3,100.0	1,000.0	100.00					
I-5 SB N of Cannon Rd	65.0	point7	7	3,000.0	7,000.0	100.00				Average	
		point8	8	3,000.0	3,000.0	100.00					
I-5 SB S of Cannon Rd	65.0	point9	9	3,000.0	2,990.0	100.00				Average	
		point10	10	3,000.0	1,000.0	100.00					
Cannon Rd-Crslbd Blvd to Ave Encns	80.0	point11	11	1,400.0	3,000.0	100.00				Average	
		point17	17	2,400.0	3,000.0	100.00					
CannonRd-PaseodelNortetoLegoland Dr	85.0	point13	13	3,910.0	3,000.0	100.00				Average	
		point19	19	6,905.0	3,000.0	100.00					
Paseo del Norte - S of Cannon Rd	60.0	point15	15	3,900.0	2,990.0	100.00				Average	
		point33	33	3,900.0	2,492.5	100.00				Average	
		point34	34	3,300.0	1,800.0	100.00				Average	
		point35	35	3,300.0	1,400.0	100.00				Average	
		point16	16	3,300.0	950.0	100.00					
Cannon Rd- Ave Encns to I-5	80.0	point18	18	2,450.0	3,000.0	100.00				Average	
		point12	12	2,990.0	3,000.0	100.00					
CannonRd-Legoland DrtoFaraday Av	85.0	point20	20	6,910.0	3,000.0	100.00				Average	
		point14	14	9,900.0	3,000.0	100.00					
CannonRd-Faraday Av to El CmnoReal	85.0	point23	23	9,905.0	3,000.0	100.00				Average	
		point24	24	14,500.0	3,000.0	100.00					
Faraday Ave Cannon Rd to College Blvd	70.0	point25	25	9,900.0	2,995.0	100.00				Average	
		point26	26	9,900.0	1,000.0	100.00					
El Camino Real Tamarack Ave to Cann	110.0	point27	27	14,500.0	6,000.0	100.00				Average	
		point28	28	14,500.0	3,050.0	100.00					

INPUT: ROADWAYS

8707

I-5 NB N of Cannon Rd	85.0	point36	36	3,100.0	7,000.0	100.00				Average	
		point37	37	3,100.0	3,000.0	100.00					
El Camino Real Cannon Rd to College	110.0	point38	38	14,500.0	1,000.0	100.00				Average	
		point39	39	14,500.0	2,990.0	100.00					

8707

4 March 2015
TNM 2.5
Calculated with TNM 2.5

8707

Cannon Road Project - Future

INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

68 deg F, 50% RH

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C:\TNM25\Projects\Cannon Road Project Carlsbad\Future

INPUT: TRAFFIC FOR LAeq1h Percentages

8707

Dudek													
M Greene													
4 March 2015													
TNM 2.5													
INPUT: TRAFFIC FOR LAeq1h Percentages													
PROJECT/CONTRACT:	8707												
RUN:	Cannon Road Project - Future												
Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Cannon Road - I5 to Paseo del Norte	point1	1	3390	97	50	2	50	1	50	0	0	0	0
	point2	2											
I-5 NB S of Cannon Rd	point3	3	9900	95	65	2	65	3	65	0	0	0	0
	point4	4											
I-5 SB N of Cannon Rd	point7	7	9950	95	65	2	65	3	65	0	0	0	0
	point8	8											
I-5 SB S of Cannon Rd	point9	9	9900	95	65	2	65	3	65	0	0	0	0
	point10	10											
Cannon Rd-Crsld Blvd to Ave Encns	point11	11	1180	97	50	2	50	1	50	0	0	0	0
	point17	17											
CannonRd-PaseodelNortetoLegoland Dr	point13	13	2610	97	50	2	50	1	50	0	0	0	0
	point19	19											
Paseo del Norte - S of Cannon Rd	point15	15	1365	97	35	2	35	1	35	0	0	0	0
	point33	33	952	97	35	2	35	1	35	0	0	0	0
	point34	34	952	97	35	2	35	1	35	0	0	0	0
	point35	35	952	97	35	2	35	1	35	0	0	0	0
	point16	16											
Cannon Rd- Ave Encns to I-5	point18	18	1630	97	50	2	50	1	50	0	0	0	0
	point12	12											
CannonRd-Legoland DrtoFaraday Av	point20	20	2350	97	50	2	50	1	50	0	0	0	0
	point14	14											
CannonRd-Faraday Av to El CmnoReal	point23	23	2160	97	50	2	50	1	50	0	0	0	0
	point24	24											
Faraday Ave Cannon Rd to College Blvd	point25	25	2070	97	50	2	50	1	50	0	0	0	0
	point26	26											

INPUT: TRAFFIC FOR LAeq1h Percentages**8707**

El Camino Real Tamarack Ave to Cann	point27	27	4435	97	55	2	55	1	55	0	0	0	0
	point28	28											
I-5 NB N of Cannon Rd	point36	36	9950	95	65	2	65	3	65	0	0	0	0
	point37	37											
El Camino Real Cannon Rd to College	point38	38	5825	97	55	2	55	1	55	0	0	0	0
	point39	39											

INPUT: BARRIERS

8707

Dudek																			
M Greene																			
INPUT: BARRIERS																			
PROJECT/CONTRACT:	8707																		
RUN:	Cannon Road Project - Future w Proj																		
Barrier																			
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)		Height	Segment					
		Min	Max	\$ per	\$ per	Top	Run:Rise	\$ per		X	Y	Z	at	Seg Ht	Perturbs	On	Important		
				Unit	Unit	Width		Unit					Point	Incre-	#Up	#Dn	Struct?	Reflec-	
				Area	Vol.			Length						ment			tions?		
		ft	ft	\$/sq ft	\$/cu yd	ft	ft:ft	\$/ft		ft	ft	ft	ft	ft	ft				
Barrier2	W	0.00	99.99	0.00				0.00	point4	4	10,020.0	2,725.0	118.00	5.00	0.00	0	0		
									point5	5	10,020.0	2,920.0	118.00	5.00	0.00	0	0		
									point6	6	10,450.0	2,920.0	118.00	5.00					

INPUT: RECEIVERS
8707

Dudek						4 March 2015					
M Greene						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	8707										
RUN:	Cannon Road Project - Future w Proj										
Receiver											
Name	No.	#DUs	Coordinates (ground)			Height	Input Sound Levels and Criteria				Active
			X	Y	Z	above	Existing	Impact Criteria		NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
M1 - Bio Habitat	1	1	4,350.0	4,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
M2 - Future Picnic Area	3	1	5,600.0	3,400.0	100.00	5.00	0.00	66	10.0	8.0	Y
M3 - Bio Habitat	5	1	8,060.0	3,525.0	100.00	5.00	0.00	66	10.0	8.0	Y
M4 - Car Country Park	6	1	3,250.0	1,500.0	100.00	5.00	0.00	66	10.0	8.0	Y
M5 - Cannon Rd / Faraday Ave	7	1	10,060.0	2,885.0	120.00	5.00	0.00	66	10.0	8.0	Y
M6 - Resi's N of Lagoon	8	1	5,200.0	5,700.0	100.00	5.00	0.00	66	10.0	8.0	Y
R1 Cannon Rd - Crlsbd Blvd to Ave Encns	9	1	2,000.0	2,900.0	100.00	5.00	0.00	66	10.0	8.0	Y
R2 Cannon Rd - Ave Encns to I-5	10	1	2,600.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R3 Cannon Road - I5 to Paseo del Norte	14	1	3,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R4 CannonRd-PaseodeINortetoLegoland	16	1	5,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R5 CannonRd-Legoland DrtoFaraday Av	17	1	8,500.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R6 CannonRd-Faraday Av to El CmnoRea	19	1	12,000.0	3,100.0	100.00	5.00	0.00	66	10.0	8.0	Y
R7 Faraday Ave Cannon Rd to College Bl	20	1	10,000.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R8 El Camino Real Cannon Rd to College	21	1	14,400.0	2,000.0	100.00	5.00	0.00	66	10.0	8.0	Y
R9 El Camino Real Tamarack Ave to Can	22	1	14,400.0	4,500.0	100.00	5.00	0.00	66	10.0	8.0	Y

INPUT: ROADWAYS
8707

Dudek					4 March 2015						
M Greene					TNM 2.5						
INPUT: ROADWAYS							Average pavement type shall be used unless				
PROJECT/CONTRACT:		8707					a State highway agency substantiates the use				
RUN:		Cannon Road Project - Future w Proj					of a different type with the approval of FHWA				
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Type	Struct?
									Affected		
	ft			ft	ft	ft		mph	%		
Cannon Road - I5 to Paseo del Norte	85.0	point1	1	3,110.0	3,000.0	100.00				Average	
		point2	2	3,900.0	3,000.0	100.00					
I-5 NB S of Cannon Rd	65.0	point3	3	3,100.0	2,990.0	100.00				Average	
		point4	4	3,100.0	1,000.0	100.00					
I-5 SB N of Cannon Rd	65.0	point7	7	3,000.0	7,000.0	100.00				Average	
		point8	8	3,000.0	3,000.0	100.00					
I-5 SB S of Cannon Rd	65.0	point9	9	3,000.0	2,990.0	100.00				Average	
		point10	10	3,000.0	1,000.0	100.00					
Cannon Rd-Crslbd Blvd to Ave Encns	80.0	point11	11	1,400.0	3,000.0	100.00				Average	
		point17	17	2,400.0	3,000.0	100.00					
CannonRd-PaseodelNortetoLegoland Dr	85.0	point13	13	3,910.0	3,000.0	100.00				Average	
		point19	19	6,905.0	3,000.0	100.00					
Paseo del Norte - S of Cannon Rd	60.0	point15	15	3,900.0	2,990.0	100.00				Average	
		point33	33	3,900.0	2,492.5	100.00				Average	
		point34	34	3,300.0	1,800.0	100.00				Average	
		point35	35	3,300.0	1,400.0	100.00				Average	
		point16	16	3,300.0	950.0	100.00					
Cannon Rd- Ave Encns to I-5	80.0	point18	18	2,450.0	3,000.0	100.00				Average	
		point12	12	2,990.0	3,000.0	100.00					
CannonRd-Legoland DrtoFaraday Av	85.0	point20	20	6,910.0	3,000.0	100.00				Average	
		point14	14	9,900.0	3,000.0	100.00					
CannonRd-Faraday Av to El CmnoReal	85.0	point23	23	9,905.0	3,000.0	100.00				Average	
		point24	24	14,500.0	3,000.0	100.00					
Faraday Ave Cannon Rd to College Blvd	70.0	point25	25	9,900.0	2,995.0	100.00				Average	
		point26	26	9,900.0	1,000.0	100.00					
El Camino Real Tamarack Ave to Cann	110.0	point27	27	14,500.0	6,000.0	100.00				Average	
		point28	28	14,500.0	3,050.0	100.00					

INPUT: ROADWAYS

8707

I-5 NB N of Cannon Rd	85.0	point36	36	3,100.0	7,000.0	100.00				Average	
		point37	37	3,100.0	3,000.0	100.00					
El Camino Real Cannon Rd to College	110.0	point38	38	14,500.0	1,000.0	100.00				Average	
		point39	39	14,500.0	2,990.0	100.00					

8707

4 March 2015
TNM 2.5
Calculated with TNM 2.5

8707

Cannon Road Project - Future w Proj

INPUT HEIGHTS

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

68 deg F, 50% RH

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C:\TNM25\Projects\Cannon Road Project Carlsbad\Fut w Proj 1 4 March 2015

INPUT: TRAFFIC FOR LAeq1h Percentages

8707

Dudek													
M Greene													
INPUT: TRAFFIC FOR LAeq1h Percentages													
PROJECT/CONTRACT:	8707												
RUN:	Cannon Road Project - Future w Proj												
Roadway	Points												
Name	Name	No.	Segment										
			Total	Autos	MTrucks		HTrucks		Buses		Motorcycles		
			Volume	P	S	P	S	P	S	P	S	P	S
			veh/hr	%	mph	%	mph	%	mph	%	mph	%	mph
Cannon Road - I5 to Paseo del Norte	point1	1	4801	97	50	2	50	1	50	0	0	0	0
	point2	2											
I-5 NB S of Cannon Rd	point3	3	9900	95	65	2	65	3	65	0	0	0	0
	point4	4											
I-5 SB N of Cannon Rd	point7	7	9950	95	65	2	65	3	65	0	0	0	0
	point8	8											
I-5 SB S of Cannon Rd	point9	9	9900	95	65	2	65	3	65	0	0	0	0
	point10	10											
Cannon Rd-Crsld Blvd to Ave Encns	point11	11	1282	97	50	2	50	1	50	0	0	0	0
	point17	17											
CannonRd-PaseodelNortetoLegoland Dr	point13	13	3224	97	50	2	50	1	50	0	0	0	0
	point19	19											
Paseo del Norte - S of Cannon Rd	point15	15	1604	97	35	2	35	1	35	0	0	0	0
	point33	33	952	97	35	2	35	1	35	0	0	0	0
	point34	34	952	97	35	2	35	1	35	0	0	0	0
	point35	35	952	97	35	2	35	1	35	0	0	0	0
	point16	16											
Cannon Rd- Ave Encns to I-5	point18	18	1758	97	50	2	50	1	50	0	0	0	0
	point12	12											
CannonRd-Legoland DrtoFaraday Av	point20	20	2751	97	50	2	50	1	50	0	0	0	0
	point14	14											
CannonRd-Faraday Av to El CmnoReal	point23	23	2451	97	50	2	50	1	50	0	0	0	0
	point24	24											
Faraday Ave Cannon Rd to College Blvd	point25	25	2179	97	50	2	50	1	50	0	0	0	0
	point26	26											

INPUT: TRAFFIC FOR LAeq1h Percentages**8707**

El Camino Real Tamarack Ave to Cann	point27	27	4581	97	55	2	55	1	55	0	0	0	0
	point28	28											
I-5 NB N of Cannon Rd	point36	36	9950	95	65	2	65	3	65	0	0	0	0
	point37	37											
El Camino Real Cannon Rd to College	point38	38	5862	97	55	2	55	1	55	0	0	0	0
	point39	39											